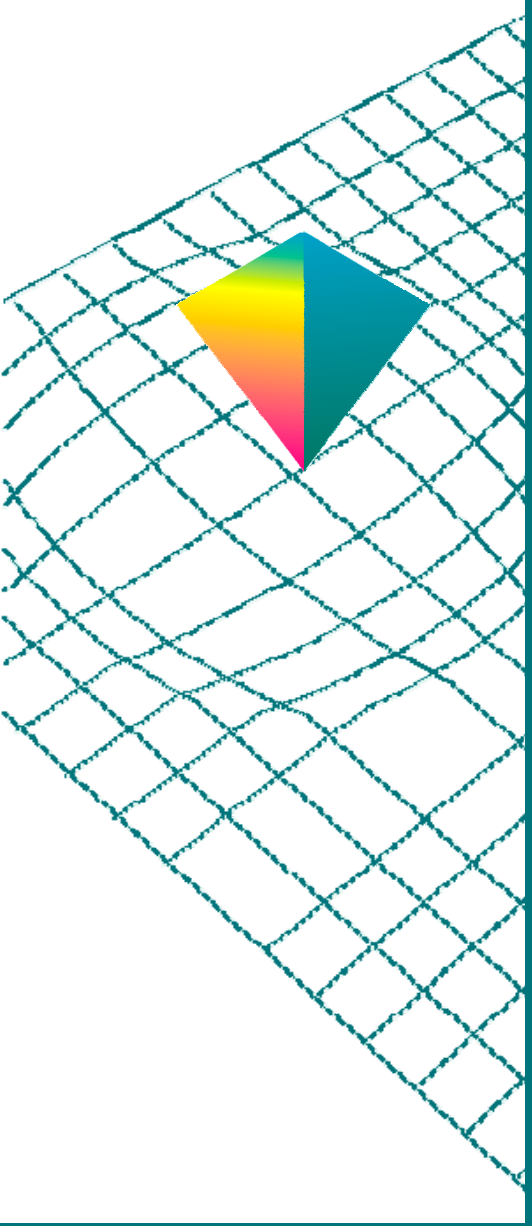
TECHNISCHE UNIVERSITÄT
ILMENAU

50. Internationales Wissenschaftliches Kolloquium

September, 19-23, 2005



Maschinenbau von Makro bis Nano / Mechanical Engineering from Macro to Nano

Proceedings

Fakultät für Maschinenbau /
Faculty of Mechanical Engineering

Startseite / Index:
http://www.db-thueringen.de/servlets/DocumentServlet?id=15745

Impressum

Herausgeber:	Der Rektor der Technischen Universität Ilmenau Univ.-Prof. Dr. rer. nat. habil. Peter Scharff
Redaktion:	Referat Marketing und Studentische Angelegenheiten Andrea Schneider Fakultät für Maschinenbau Univ.-Prof. Dr.-Ing. habil. Peter Kurtz, Univ.-Prof. Dipl.-Ing. Dr. med. (habil.) Hartmut Witte, Univ.-Prof. Dr.-Ing. habil. Gerhard Linß, Dr.-Ing. Beate Schlütter, Dipl.-Biol. Danja Voges, Dipl.-Ing. Jörg Mämpel, Dipl.-Ing. Susanne Töpfer, Dipl.-Ing. Silke Stauche
Redaktionsschluss: (CD-Rom-Ausgabe)	31. August 2005
Technische Realisierung: (CD-Rom-Ausgabe)	Institut für Medientechnik an der TU Ilmenau Dipl.-Ing. Christian Weigel Dipl.-Ing. Helge Drumm Dipl.-Ing. Marco Albrecht
Technische Realisierung: (Online-Ausgabe)	Universitätsbibliothek Ilmenau ilmedia Postfach 10 05 65 98684 Ilmenau
Verlag:	isle Verlag ISLE, Betriebsstätte des ISLE e.V. Werner-von-Siemens-Str. 16 98693 Ilmenau

ISBN (Druckausgabe):	3-932633-98-9	(978-3-932633-98-0)
ISBN (CD-Rom-Ausgabe):	3-932633-99-7	(978-3-932633-99-7)

Startseite / Index:
http://www.db-thueringen.de/servlets/DocumentServlet?id=15745

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O.A. Vinogradova/ D.N. Frolov

Ease of Manufacturing and Definition of the Tolerances for Fabrication and Assemblies of Microobjectives

In the making optical systems lenses for microscopes appears the question about possibility of their fabrication in conditions of serial production.

Ease of manufacturing – is the collection of characteristics on optimisation of the expenses of the labour, facilities, materials and time at preparing and fabrication instruments.

The fabrication of the optical details of microobjectives and their assembly in united optical system at production – is a complex technological problem.

By means of computing machinery the influence of the deflections of constructive elements on optical features can be installed on stage aberration calculation of the systems. For reception accounting quality of image in real maked lens necessary to provide required accuracy of the reception of the accounting profile of the lenses. Constructor must fix the tolerances on thickness of optical details, deflections on factors of refraction of optical materials and the accuracy of fabrication of radiuses a curvature of surfaces.

The method of the determination tolerances of fabrications of the optical details on base of the analysis of aberration axial and nonaxial bunches of rays is present in this article.

At definition of the tolerances on fabrication of the optical details constructor prototypes the real process of the assembly of the lens. The errors in the process of fabrication of the optical details removes by means of the small change minimum two air gaps. One of them – is a worker length of microobjective, which limits of the change are connected with theoretical depth of the sharpness. Other are fixed by Constructor and are used for minimization aberration axial and nonaxial bunches.

In base of the offered method is supposed that input and output apertures of microobjectives give accuracy of the execution paraxial features and are connected straight with its resolving ability.

Changing air gap for correcting and producing refocusing on object, worker obtains the minimum spherical aberration.

After checking the passing worker aperture is considered that lens ready.

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